**Undertaking # 23**

Please provide how implied market value is calculated, referencing results on PDF page 9 of the ellement consulting report in response to CAC1-96.

**RESPONSE:**

Non-marketable bonds are issued by Manitoba municipalities, school divisions and hospitals (MUSH). These bonds are issued at par, with level annual payments and are amortizing (i.e. each payment consists of both principal and interest). The principal repayment increases as time to maturity decreases and the interest payments decrease (similar to a mortgage repayment schedule).

There is no active secondary market for these bonds (i.e. they cannot be sold) and therefore no market values. For accounting purposes these bonds are classified as "Held to Maturity" and are reported at historical cost or book value (i.e. future payments are discounted at the coupon rate to the valuation date, which yields a price of 100 or par).

The implied market value for MUSH bonds is calculated for performance reporting purposes. The implied market value is based on the standard bond pricing formula, using a Manitoba based yield curve (constructed using the latest rates for newly issued MUSH bonds) for the assumed interest rates. The implied market value is based on the price of a regular bullet bond with annual interest payments and a single principal payment at maturity. The weighted average life[1] ("WAL") is used as the term to maturity. This method produces a good approximation of the pure valuation method (the pure valuation method discounts all future payments as zero coupon bonds with a corresponding yield on the yield curve).

[1] The Handbook of Fixed Income Securities, Fourth Edition, Edited by Frank J. Fabozzi and T. Dessa Fabozzi, Page 518

**Variables**

Term to maturity = WAL (which on average is slightly more than ½ term to maturity except for long term to maturity bonds which are slightly less than ½ term to maturity).

Yield = the current rate for a newly issued MUSH bond at the WAL date (the yield is based on the monthly rates for fixed term loans made by the Province of Manitoba to its Crown Corporations and Government Agencies where the Principal is to be Repaid at end of the Term).

Par = 100

Settlement Date = Valuation Date

Weighted Average Life = (Sum of (Time * Principal Payment Schedule)) / Total Principal.